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Transportation Cost Analysis for
EDDS Vendor Consolidation -
Chicago, IL

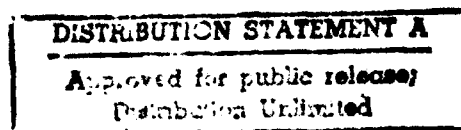
OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE



DEPARTMENT OF DEFENSE

DEFENSE LOGISTICS AGENCY

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Charles F. Myers II

**DEPARTMENT OF DEFENSE
DEFENSE LOGISTICS AGENCY
OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE
CAMERON STATION
ALEXANDRIA, VA 22304-6100**

August 1990



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CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

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FOREWORD

This report documents the results of a transportation cost analysis of vendor freight consolidation at the Chicago, IL Enhanced DLA Distribution System (EDDS) contractor operated facility for the eleven-month period ending 31 March 1990. The study is the result of a request from the Directorate of Supply Operations, Transportation Division, EDDS Support Office (EDSSO) and is part of the continuing analysis of the EDDS implementation and operation.

Analysis showed that during the first 11 months of operation, vendor consolidation at Chicago, IL saved approximately \$151,630 in transportation expenditures. This figure includes losses incurred during the initial start-up period. During the last 5 months of operation estimated transportation savings were estimated to be \$170,282. Based on observed trends in the EDDS data for Chicago, IL transportation savings are expected to continue.

Christine L. Gallo

CHRISTINE GALLO
Deputy Assistant Director
Office of Policy and Plans

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EXECUTIVE SUMMARY

Vendor consolidation under the Enhanced DLA Distribution System (EDDS) is the method of collecting small less-than-truckload (LTL) shipments from commercial vendors at or near origin and combining shipments to build larger LTL or truckload shipments for movement to the DLA supply depots for replenishment of inventory. Savings in transportation dollars are expected to accrue based on the difference in the cost of shipping many small LTL shipments direct to the depots versus collecting those same LTL shipments at a facility and consolidating them into one large LTL or truckload shipment for movement to the depots at lower volume prices. The savings should eventually be passed on to DLA in the form of lower item prices.

Analysis showed that under the current method of operation at the Chicago, IL EDDS facility, an estimated savings of \$151,630 resulted during the first 11 months of operation. During the last 5 months of operation (November 1989 through March 1990), estimated savings amounted to \$170,282. The EDDS contractor appears to be consolidating to the maximum extent possible to each depot destination.

We recommend the following:

- o Continue to monitor carrier operations to ensure that maximum consolidation is maintained.

I. BACKGROUND

The Defense Logistics Agency's (DLA) Directorate of Supply Operations. Transportation Division (DLA-OT), Enhanced DLA Distribution System Support Office (EDSSO) requested a transportation cost analysis of vendor consolidation at the Chicago, IL Enhanced DLA Distribution System (EDDS) facility. The analysis covers vendor shipments destined for the 6 DLA supply depots between 1 May 1989 and 31 March 1990.

Vendor consolidation is the process of collecting small, less-than-truckload (LTL) shipments from commercial vendors at or near origin and combining these shipments to build larger LTL or truckload (TL) shipments for movement to the DLA supply depots to replenish inventory. Savings are expected to accrue based on the difference in the cost of shipping many small LTL shipments direct to the depots versus the cost of collecting those same LTL shipments at a facility at or near origin and consolidating them into one large LTL or TL shipment for movement to the depots at a lower volume rate.

Studies conducted by the DLA Operations Research and Economic Analysis Management Support Office (DORO) have shown that vendor consolidation has the potential to save considerable transportation dollars. Currently, any savings achieved through this program will be indirect since the vendor will ship to the EDDS facility free-on-board destination. DLA expects these savings will eventually be passed on through lower item prices. The scope of this report covers only the estimated transportation cost differential between direct shipment to a depot versus transshipment through EDDS. A determination as to whether DLA has received a reduction in contract prices is beyond the scope of this report.

II. CONCLUSIONS

Vendor consolidation at the Chicago, IL EDDS facility has resulted in an estimated net savings of \$151,630 during the first 11 months of operation. When losses experienced during the start-up period (first 6 months) are not considered, vendor consolidation saved approximately \$170,282 over the last 5 months of operation.

The carrier appears to be utilizing trailers to the maximum extent possible with average shipment sizes ranging between 20,000 and 31,000 pounds in February and March 1990. If this trend continues estimated savings from vendor consolidation at the Chicago, IL EDDS facility should continue.

III. RECOMMENDATION. Continue to monitor carrier operations to insure that maximum consolidation is maintained.

IV. STUDY APPROACH

A. Purpose. The purpose of this study is to determine if the vendor consolidation concept under the EDDS at Chicago, IL is a cost effective means of shipping vendor freight to the 6 DLA depots.

B. Objectives. The objectives are as follows:

1. To determine the characteristics of shipments into and out of the EDDS facility (mode and weight).
2. To estimate vendor shipping costs for both direct and EDDS shipments. Use the calculated costs to compare the two methods of shipment and determine the dollar cost differentials.
3. Identify any problems with consolidation at the EDDS site and offer recommendations for improvement.

V. ANALYSIS

A. Inbound Shipment Characteristics

Vendor shipments are moved into the EDDS site by three main methods of transportation, they are commercial motor carrier, private motor carrier, and small parcel carrier. These shipments can be categorized into two shipment types, LTL and small parcel. Figure 1 shows a breakdown of inbound shipments by aggregated weight, number of shipments, and average weight. Small parcels account for approximately 82 percent of the number of shipments (27,850 shipments) and 5 percent of the total shipment weight (486,720 pounds) received at the EDDS site. On the other hand, LTL freight amounts to about 18 percent of the number of shipments (6,192 shipments) and 95 percent of the total shipment weight (9,276,371 pounds).

Inbound tonnage has increased steadily over the 11 month period. Table 1 shows a breakdown of the tonnage for the period 1 May 1989 through 31 March 1990 for Chicago. Included in Table 1 are average weights for both LTL and small parcels. An average inbound LTL shipment weighed 1498 pounds while inbound small parcels averaged 17.4 pounds. Figure 2 shows the information graphically.

Table 1

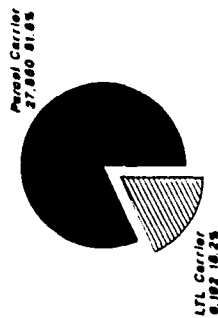
VENDOR RECEIPTS BY MONTH - Chicago, IL

<u>Month</u>	<u>Weight</u>	<u>Shipments</u>	<u>Average Weight</u>	
			<u>Parcels</u>	<u>LTL</u>
89 May	135,319	211	15	826
Jun	257,544	1,359	15	985
Jul	427,613	2,688	17	1,220
Aug	780,837	4,120	16	1,421
Sep	888,711	3,550	17	1,358
Oct	628,672	2,727	18	1,156
Nov	1,206,293	4,011	19	1,537
Dec	1,336,466	3,561	19	1,741
90 Jan	1,274,684	4,093	18	1,524
Feb	1,308,491	3,759	17	1,695
Mar	1,518,461	3,963	18	1,808
Total	9,763,091	34,042	17	1,498

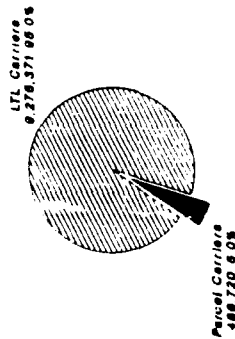
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EDDS INBOUND VENDOR SHIPMENTS Chicago EDDS Site - May 89 thru Mar 90

SHIPMENTS



WEIGHT



INBOUND VENDOR TONNAGE Chicago, IL EDDS Site

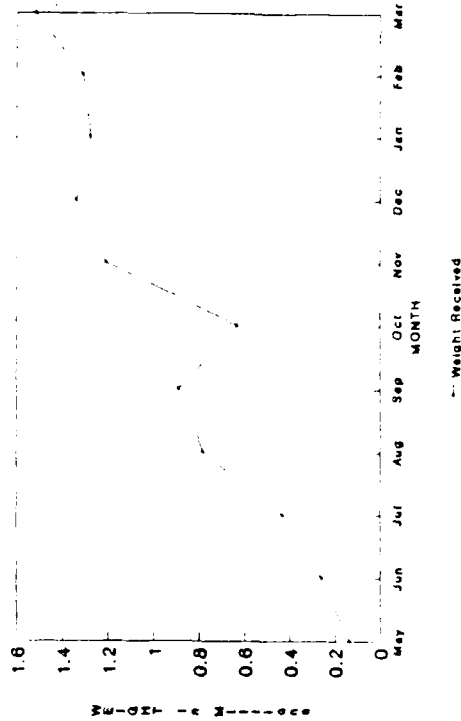


Figure 1

Figure 2

B. Outbound Shipment Characteristics

After vendor shipments arrive at the EDDS site they are consolidated into large LTL or TL shipments and forwarded to the DLA depot consignee on a routine basis. Outbound shipment weights should be considerably higher than the weights of shipments received from the vendors. Experience gained since the beginning of the vendor consolidation phase of EDDS has shown that carrier trailers will reach maximum cube utilization between 18,000 and 25,000 pounds depending on the product mix. Shipment frequencies should be relatively low but do depend on the distance and time needed to deliver the freight to the receiving depot within specified standards. Table 2 shows the average outbound shipment weight by month and receiving depot. Table 3 shows the corresponding outbound shipment frequencies.

Table 2

AVERAGE OUTBOUND SHIPMENT SIZE IN POUNDS

	<u>DDRV</u>	<u>DDCO</u>	<u>DDMP</u>	<u>DDTC</u>	<u>DDOU</u>	<u>DDMT</u>
89 May	4,845	2,927	2,317	5,269	7,591	3,905
Jun	6,595	6,474	6,947	12,136	6,101	4,571
Jul	9,835	6,283	11,876	18,788	13,736	8,344
Aug	20,021	18,744	11,149	14,712	25,743	16,420
Sep	17,803	12,764	15,009	18,350	19,784	25,151
Oct	20,995	13,467	12,591	26,203	23,446	21,379
Nov	23,651	29,159	20,344	22,384	19,762	28,046
Dec	20,007	31,163	28,228	21,727	22,726	27,614
90 Jan	23,817	24,393	29,950	23,610	21,358	29,899
Feb	27,525	23,066	20,070	26,611	24,267	27,945
Mar	30,611	31,315	25,399	29,955	24,854	25,872

Table 3

OUTBOUND SHIPMENT FREQUENCIES

	<u>DDRV</u>	<u>DDCO</u>	<u>DDMP</u>	<u>DDTC</u>	<u>DDOU</u>	<u>DDMT</u>	<u>Total</u>
89 May	6	6	5	6	5	7	35
Jun	8	7	6	4	5	9	39
Jul	10	8	8	8	5	9	48
Aug	7	6	10	8	4	7	42
Sep	8	9	8	9	6	7	47
Oct	8	6	7	5	5	8	39
Nov	7	7	11	11	8	8	52
Dec	10	5	5	11	9	8	48
90 Jan	8	5	7	14	11	9	54
Feb	6	8	8	12	10	12	56
Mar	9	7	9	9	11	10	55

The average weight per outbound shipment has increased steadily since May 1989 indicating that the carrier is consolidating better as experience is gained and the inbound weight increases. Corresponding outbound shipment frequencies have remained relatively constant over the same period of time. It appears that the carrier has reached maximum consolidation by fully utilizing available trailer space. Table 4 gives a breakdown of weight received by depot.

Table 4

DEPOT RECEIPTS - MAY 1989 TO MAR 1990

<u>DEPOT</u>	<u>SHPTS</u>	<u>WEIGHT</u>
Richmond	87	1,627,517
Columbus	74	1,307,185
Mechanicsburg	84	1,431,694
Tracy	97	2,049,006
Ogden	79	1,589,667
Memphis	94	1,914,036
Total	515	9,919,105

C. Cost Analysis

Cost comparison of EDDS versus non-EDDS shipments necessitates that the data be processed into three files. The first covers shipments from the vendor to the EDDS site for consolidation. This file is built by aggregating the EDDS history file for Chicago by inbound bill number. The second file incorporates shipments made from the EDDS site to each of the DLA depots. This file is built by aggregating the EDDS history file on outbound government bill of lading (GBL) number. By combining the shipments in both files, movement through the EDDS system is emulated. A third file was built from the EDDS history file which simulated shipment of the same material on a direct basis from vendor origin to the DLA depot consignee. Direct shipments were aggregated by inbound bill number, depot destination, and contract number. The total number of EDDS shipments was 34,042 while the number of direct shipments was estimated at 43,303. The difference of 9,261 in the number of shipments between EDDS and non-EDDS reflects a secondary level of consolidation being accomplished at the vendor origin, i.e. - more than one depot's freight on the same bill going to the EDDS site.

Once the files were built, they were rated using a program designed to individually rate each shipment with the appropriate rate tables. Direct LTL shipments were rated with commercial class rates at class 50 with a 10 percent discount. LFL shipments from vendor to the EDDS site for consolidation were also rated at class 50 with a 10 percent discount. The rate level and discount are based on samples of inbound vendor shipments taken

at the New York, NY EDDS site¹ and the Defense Depot located at Richmond, Va (internal DORO analysis). Small parcels were rated using United Parcel Service (UPS) surface parcel rates. Consolidated shipments from the EDDS site to the depots were rated using the applicable government tenders. After completing the rating process, cost data were compiled and are shown in Table 5.

Table 5

SAVINGS PROJECTION FOR THE CHICAGO, IL EDDS SITE
May 1989 through March 1990

MONTH	IN	*** EDDS *** OUT	TOTAL	DIRECT	SAVINGS
<u>89</u>					
May	\$23,906	\$13,516	\$37,422	\$79,719	\$42,297
Jun	42,974	20,002	62,976	96,807	33,831
Jul	66,543	39,545	106,088	79,723	(26,365)
Aug	115,605	44,759	160,364	135,063	(25,301)
Sep	132,139	55,334	187,473	154,966	(32,507)
Oct	98,465	48,287	146,752	136,145	(10,607)
Nov	163,951	75,618	239,569	221,727	(17,842)
Dec	124,996	73,339	198,335	255,506	57,171
<u>90</u>					
Jan	131,568	87,540	219,108	256,173	37,065
Feb	121,859	89,816	211,675	255,868	44,193
Mar	144,572	92,215	236,787	286,482	49,695
Total	\$1,166,578	\$639,971	\$1,806,549	\$1,958,179	\$151,630

During the first 6 months of operation losses amounted to approximately \$18,652 due to low tonnages. However, as the inbound weight increased and consolidation at the site improved the site began to save money. During the November 1989 through March 1990 time frame, savings amounted to \$170,282. The problems with initial start-up appear to have been overcome and the estimated savings seem to be consistent. If consolidation continues at current levels savings can be expected to continue. Sensitivity analysis was not performed since it has already been shown in similar studies that maximum consolidation significantly increases savings.² The EDDSSO's goal is to obtain maximum consolidation wherever possible.

1. Defense Logistics Agency, "Transportation Cost Analysis of New York EDDS Vendor Consolidation", DLA Project No. DLA-XX-P90174, March 1990.

2. Ibid.

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